numbered paragraph 2 of the Official Action. The Official Action asserts that Lu discloses all of the features recited in the rejected claims. This rejection is respectfully traversed for the following reasons.

Claim 1, as amended, recites a method of processing semiconductor substrates and reducing particle contamination during processing of the substrates, which comprises the step of "placing at least one substrate on a substrate holder in an interior space of a vacuum processing chamber, the processing chamber including at least one ceramic part made of a non-oxide ceramic material and having a machined and/or sintered surface exposed to the interior space, the exposed surface having been treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment" (emphasis added). Lu does not disclose the combination of features recited in Claim 1 and in the claims dependent therefrom for the following reasons.

According to the method recited in Claim 1, the processing chamber includes at least one part made of a non-oxide ceramic material and which has a surface exposed to the interior space of the vacuum processing chamber. The surface has been machined and/or sintered and treated to reduce particles of the non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment. The particles of the non-oxide ceramic material result from the machining and/or sintering processes performed during the manufacture of the part (see the paragraph bridging pages 8 and 9 of the specification). The machining and/or sintering produces particles of the material from which the part is made, that are attached to the shaped surface (see page 8, lines 17-18).

These attached particles can be a source of particle contamination during processing of semiconductor substrates.

Lu does not disclose the combination of features recited in Claim 1. The Official Action asserts at pages 2 and 3 that Lu discloses "(a) placing at least one substrate on a substrate holder in an interior space of a vacuum processing chamber, the processing chamber including at least one non-oxide ceramic part having a surface exposed to the interior space, the surface having been shaped and treated to reduce particles thereon by a high intensity plasma condition treatment." As explained during the April 5, 2002 interview, Lu discloses the formation of SiC films 42 on sintered or hot-pressed SiC 40 that may be shaped (col. 5, lines 38-44 and Fig. 2). Lu discloses that such sintered SiC sintered structures have a highly granular structure that can be mechanism for producing particulate (col. 4, lines 5-9). Lu addresses this problem by forming the SiC films by CVD or other film deposition process. Lu discloses that the SiC films provide a surface that is resistant to etching and to particulate formation.

However, Lu does not disclose a surface that has been machined and/or sintered and treated to reduce particles of non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment. Rather, although Lu's substrate structure of sintered or hot-pressed SiC is formed into a "desired shape," a SiC film is deposited over the substrate structure (col. 4, lines 47-58). Because the substrate structure is covered by the film, the substrate structure would not include a "surface exposed to the interior space" of a vacuum processing chamber, as recited in Claim 1. Rather, the SiC film covering the substrate structure is exposed to the interior of the reactor chamber.

However, Lu does not disclose that the SiC film includes a surface exposed to the interior space that has been machined and/or sintered. Furthermore, Lu does not disclose that the substrate structure is treated to reduce particles of non-oxide ceramic material attached to the exposed surface by a high intensity plasma conditioning treatment. Rather, Lu's substrate structure is covered by the film, to avoid the particulate problems that would otherwise occur with respect to the substrate structure.

Accordingly, Claim 1 is clearly patentable over Lu. Claims 3, 6-11, 13 and 14 depend from Claim 1 and thus are also patentable over Lu for at least the same reasons as those stated for Claim 1.

Claim 15 recites "a method of plasma conditioning a machined and/or sintered surface of a ceramic part of a semiconductor processing chamber, the part being made of a ceramic material, the method comprising treating the surface to reduce particles of the ceramic material attached to the surface by contacting the surface with a high intensity plasma" (emphasis added). The combination of features recited in Claim 15 is also not disclosed by Lu for the reasons stated above with respect to Claim 1. Claims 17 and 19-30 depend from Claim 15 and thus are also patentable over Lu for at least the same reasons as those for Claim 15. Therefore, withdrawal of the rejection is respectfully requested.

Claims 2, 4, 5, 12, 16 and 18 were rejected under 35 U.S.C. §103(a) over Lu in view of U.S. Patent No. 5,863,376 ("Wicker"). The reasons for the rejection are set forth in numbered paragraph 4 of the Official Action. In particular, the Official Action at page 4 asserts that Wicker discloses a planar antenna, the use of oxygen gas, process parameters

and sequential wafer treatment. This rejection is respectfully traversed for the following reasons.

According to the invention, manufactured and/or sintered parts are treated to minimize particle contamination of semiconductor substrates processed in the chamber (specification at page 6, lines 21-25). In order to condition such parts to minimize particle generation during subsequent semiconductor processing, exposed surfaces of the parts are treated by a high intensity plasma conditioning treatment to reduce particles of the material from which the part is made that are attached to the surface. No such conditioning treatment is disclosed or suggested in Lu or Wicker. Lu does not remove particulates attached to the surface of the substrate structure, but rather applies a SiC film over the surface so that particulates on the surface are prevented from causing contamination problems. Accordingly, the method recited in Claims 1 and 15, and thus also in Claims 2, 4, 5, 12, 16 and 18 dependent therefrom, is patentable over Lu and Wicker. Therefore, withdrawal of the rejection is respectfully requested.

Therefore, it is submitted that the differences between the claimed subject matter and the cited references are such that the claimed subject matter, as a whole, would not have been obvious at the time the invention was made to a person having ordinary skill in the art.

New Claims 31 and 32 depend from Claim 1 and accordingly are also patentable for at least the same reasons as those stated for Claim 1.

New Claims 33 and 34 depend from Claim 15 and accordingly are also patentable for at least the same reasons as those stated for Claim 15.

In view of the foregoing, Applicant submits that the application is in condition for allowance and such action is earnestly solicited.

Respectfully submitted,

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Attachment to Amendment dated April 19, 2002

Marked-up Claims 1, 15-18 and 24-29

1. (Amended) A method of processing semiconductor substrates and reducing particle contamination during processing of the substrates, the method comprising steps of:

(a) placing at least one substrate on a substrate holder in an interior space of a vacuum processing chamber, the processing chamber including at least one [non-oxide] ceramic part made of a non-oxide ceramic material and having a machined and/or sintered surface exposed to the interior space, the exposed surface having been [shaped and] treated to reduce particles [thereon] of the non-oxide ceramic material [on] attached to the exposed surface by a high intensity plasma conditioning treatment;

(b) processing the at least one substrate by supplying process gas to the processing chamber; and

(c) removing the at least one substrate from the processing chamber.

15. (Amended) A method of plasma conditioning a [shaped] machined and/or sintered surface of a ceramic part of a semiconductor processing chamber, the part being made of a ceramic material, the method comprising treating the [shaped] surface to reduce particles [thereon] of the ceramic material attached to the surface by contacting the [shaped] surface with a high intensity plasma.

16. (Amended) The method according to Claim 15, wherein the ceramic part is conditioned in a processing chamber which includes a substantially planar antenna which energizes process gas into a plasma state by supplying RF power to the antenna and the process gas comprising at least one fluorocarbon gas, the plasma conditioning being carried out by energizing the fluorocarbon gas into a plasma state and contacting the [shaped] machined and/or sintered surface with the plasma.

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Marked-up Claims 1, 15-18 and 24-29

17. (Amended) The method according to Claim 16, the ceramic part is conditioned in a processing chamber which wherein a process gas is energized into a plasma state, the process gas comprising at least one fluorocarbon gas, the plasma conditioning being carried out by energizing the fluorocarbon gas into a plasma state and contacting the [shaped] machined and/or sintered surface with the plasma.

18. (Amended) The method according to Claim 15, wherein the ceramic part comprises a gas distribution plate mounted in a processing chamber which includes a substantially planar coil which energizes process gas into a plasma state by supplying RF power to the antenna, the plasma conditioning being carried out by contacting the [shaped] machined and/or sintered surface with a high density plasma while adjusting pressure in the processing chamber to 200 to 500 mTorr, supplying the coil with 2000 to 2500 W of radio frequency power, and/or changing coil termination capacitance of the coil so as to move an area of higher intensity plasma across the gas distribution plate.

24. (Amended) The method according to Claim 15, wherein the method further includes installing the ceramic part in a plasma reactor, the plasma conditioning comprising treating the [shaped] machined and/or sintered surface with a high density plasma while powering the ceramic part to increase ion bombardment thereof.

25. (Amended) The method according to Claim 15, wherein the method further includes installing the ceramic part in a plasma reactor, the plasma conditioning comprising treating the [shaped] machined and/or sintered surface with a high density plasma generated by energizing a halogen gas into a plasma state.

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Marked-up Claims 1, 15-18 and 24-29

26. (Amended) The method according to Claim 15, wherein the method further includes installing the ceramic part in a plasma reactor, the plasma conditioning comprising treating the [shaped] machined and/or sintered surface with a high density plasma generated by energizing an inert gas into a plasma state.

27. (Amended) The method according to Claim 15, wherein the method further includes installing the ceramic part in a plasma reactor, the plasma conditioning comprising treating the [shaped] machined and/or sintered surface with a high density plasma generated by energizing oxygen gas into a plasma state.

28. (Amended) The method according to Claim 15, wherein the ceramic part is a silicon carbide part and the method further includes installing the silicon carbide part in a plasma reactor, the plasma conditioning comprising treating the [shaped] machined and/or sintered surface with a high density plasma generated by energizing a fluorine containing gas into a plasma state.

29. (Amended) The method according to Claim 15, wherein the method further includes installing the ceramic part in a plasma reactor, the plasma conditioning comprising treating the [shaped] machined and/or sintered surface with a high density plasma while seasoning the reactor.